

Ceratobregma striata, a New Triplefin (Tripterygiidae) from Northern Australia, and a Record of *Norfolkia brachylepis* from Western Australia

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Abstract A new species of tripterygiid fish, belonging to the recently described genus *Ceratobregma* Holleman, 1987, is characterized by a total of 17 spines in the second dorsal fin, 8 rays in the third dorsal fin, 20 anal fin rays (spines + rays = 22), 14 + 21 lateral line scales, a total of 35–37 lateral scale series, small spiny scales on the sides of the head behind the eye and on the upper cheeks, 14 vertical dark stripes along the upper sides of the body, and 8 basal blotches on the second dorsal fin. A key to the species of *Ceratobregma* is presented. *Norfolkia brachylepis* is described and recorded from northwestern Australia. *Norfolkia springeri* is synonymized with *N. brachylepis*.

Several species of scaly headed tripterygiids are known from the Indo-West Pacific. Most of them occur around Australia and New Zealand. While most of the species were originally described under the name *Tripterygion*, they were later assigned to different genera: *Gillias* Evermann et Marsh, 1899; *Notoclinops* Whitley, 1930; *Vaclusella* Whitley, 1931; *Forsterygion* Whitley et Phillipps, 1939; *Norfolkia* Fowler, 1953; *Cremnochorites* Holleman, 1982; Genus A Russell, 1983; *Karalepis* Hardy, 1984; *Ceratobregma* Holleman, 1987. There is no recent revision of tripterygiid fish genera, though one is necessary to reduce the existing confusion in the classification of the numerous species.

During extensive collecting of fishes in Northern Australia by Helen K. Larson of the Northern Territory Museum of Arts and Sciences, Darwin, Australia (NTM), two species of scaly headed triplefins were collected. They are described in the present paper. One represents a new species of *Ceratobregma*; the other a new record from Australia.

Methods follow Clark (1980) and other authors who recently described new genera of triplefins (Holleman, 1982, 1987; Hardy, 1984, 1987). Material for comparison was examined from the collections of the Hebrew University of Jerusalem (HUJF) and the National Museum of Natural History, Washington D. C. (USNM).

Ceratobregma Holleman, 1987

Ceratobregma Holleman, 1987: 174. Type species: *Ceratobregma helenae* Holleman, 1987 by original designation.

Diagnosis. Lateral ethmoids expanded to form bony ridges in front of eyes, bearing spines in males; interorbital with serrae; most parts of preoperculum, operculum and pectoral fin base naked; a discontinuous lateral line, consisting of an upper, pored series separated by two scale rows from a lower series of incised scales. Nasal and orbital tentacles present. Patch of teeth on vomer and anterior end of each palatine. First dorsal fin with three spines. Anal fin with 2 spines. Pelvic fin with two rays not united by membrane.

Ceratobregma striata sp. nov.

(Fig. 1)

Holotype (only known specimen). NTM S10605–018, male, 29.5 mm SL, North Oxley Island, Northern Territories, Australia, H. K. Larson and R. Williams, 20 Oct. 1982.

Diagnosis. A *Ceratobregma* with 17 spines in the second dorsal fin and 8 rays in the third dorsal fin, 2 spines and 20 rays in the anal fin, 14 + 21 lateral line scales, small spiny scales on the sides of the head and upper cheeks, a naked preoperculum, operculum and pectoral fin base, 14 vertical stripes along the upper sides of the body, and 8 black, basal blotches on the

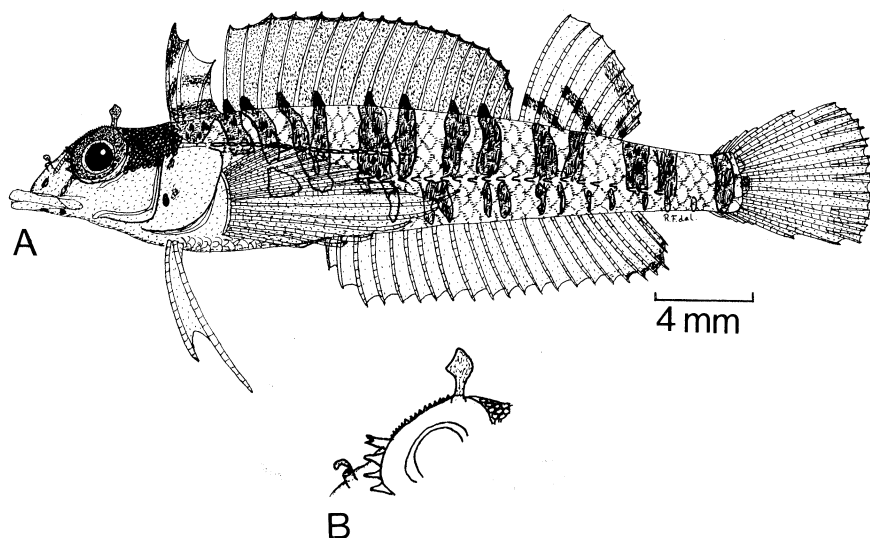


Fig. 1. *Ceratobregma striata* sp. nov., holotype, NTM S10605-018, 29.5 mm SL, Northern Territories, Australia. A, lateral view; B, orbital area (dorsal half), showing spines and tentacles.

second dorsal fin.

Description. D_1 III; D_2 XVII; D_3 vii, 1; A II, xix, 1 (total 22); P_1 iii, 6, vi-vii (total 15-16); P_2 I, 2; C (vi), ii, 9, ii, (v). Lateral line scales 14+21. Total lateral scale series 35-37. Transverse scale rows 9. Preorbital spines 4. Proportions of the holotype see Table 1.

Body elongate and laterally compressed. Head 3.7 in SL. Snout angle 50° . Preorbital length 4 in head. Eye 3 in head. Interorbital region with small ridges covered with serrae. Eye dorsally with a quadrangular tipped tentacle (Fig. 1B). Upper jaw length (maxillary+premaxillary) 2.5 in head. Patches of teeth on vomer and anterior end of each palatine. Cephalic lateral line running from interorbital space to preorbital region and along the sides of the head, with a suborbital and a preoperculo-mandibular branch. The lines of the opposite sides are interconnected by a nearly straight (I-shaped) branch across the occiput. Lateral line consisting of 14 pored scales in the anterior series (4th scale row from above), ending below the 10th D_2 membrane, discontinuous, continuing 2 rows lower with 21 posteriorly incised scales (6th scale row from above). The two lateral line series overlap over 3 vertical scale rows. Occiput and upper cheeks with small, spiny scales. Lower three fourths of preoperculum, operculum and pectoral fin base naked. Body covered with ctenoid scales; one vertical row of cycloid scales on the caudal fin base. Belly covered with

cycloid scales. Caudal peduncle length 8.1 in SL. Caudal peduncle depth 13.2 in SL.

First spine of first dorsal fin longer than second spine, and longer than first spine of second dorsal fin. Predorsal (1) length 4.7 in SL. Predorsal (2) length 3.5 in SL. Predorsal (3) length 1.4 in SL. Anal fin beginning below about 7th spine of second dorsal fin. Preanal fin length 2.4 in SL. Pectoral fin reaching back to about 9th anal fin membrane. Pelvic fin reaching back to about 2nd anal fin spine. Caudal fin distally mostly straight, only slightly convex.

Color in alcohol: Yellowish; preorbital region and operculum with a few brown spots. Upper sides of body with 2 unpaired and 6 pairs of dark brown streaks (total 14), the 2nd to 9th originating in black blotches on the base of the second dorsal fin. Lower sides of body with 8 pairs of dark brown spots. First dorsal fin with 3 horizontal dark streaks. Second dorsal fin with a narrow black margin distally, membranes dusky, base with 8 black blotches on 1st, 2nd, 4th, 6th, 9th, 11th, 14th and 16th spines. Third dorsal fin with 3 transverse dark streaks basally; posterior half dusky distally. Anal fin translucent; last membrane distally blackish. Pectoral and pelvic fins whitish, colorless. Caudal fin colorless except for a median dark spot basally.

Distribution. This new species is known only from North Oxley Island, Northern Territories, Australia (Fig. 2). It was collected in shallow water.

Etymology. "Striata" (Latin) means striped.

The name refers to the 14 vertical stripes along the upper sides of the body of this new species.

Relationships. *Ceratobregma striata* sp. nov. differs from *C. helenae* Holleman, 1987 (175–177, fig. 2) in having 17 spines in the second dorsal fin (*C. helenae*: 15–16), 8 rays (total) in the third dorsal fin (*C. helenae*: 9–10), 14+21 lateral line scales (*C. helenae*: 15–17+22–24), the presence of small spiny scales on the upper sides of the head behind the eyes, a horizontally striped first dorsal fin, the pectoral fin base without clusters of melanophores, and a black, basal spot on the caudal fin. The new species differs from *Ceratobregma acanthops* (Whitley, 1944) in the characters compared in Table 2. A species which was described from the Galapagos Islands and Colombia under the name *Enneapterygius corallicola* by Kendall and Radcliffe (1912: 153, pl. 7, fig. 1; Fowler, 1944: 521) is close to the genus *Ceratobregma*, but differs in lacking preorbital spines and in having a longer upper series of lateral line scales. I cannot decide at present if it can be included into *Ceratobregma*, or if it represents an undescribed genus of its own. *Ceratobregma striata* is distinguished from “*Enneapterygius corallicola* Kendall et Radcliffe, 1912 in its fin formulae (D_2 XV; D_3 xii–xiii, 1 in *E. corallicola*), the head scales (operculum and pectoral fin base scaled in *E. corallicola*), the longer pectoral fin, and the caudal and anal fin color patterns.

Key to the species of *Ceratobregma*

- 1a. Upper sides of head behind the eyes with small spiny scales; third dorsal fin with 8 rays.....*Ceratobregma striata* sp. nov.
- 1b. Upper sides of head behind the eyes scaleless; third dorsal fin with 9–10 rays.....2
- 2a. D_2 with 15–16 spines; A with 19–21 soft rays.....*Ceratobregma helenae* Holleman, 1987
- 2b. D_2 with 17–18 spines; A with 21–22 soft rays
.....*Ceratobregma acanthops* (Whitley, 1964a)

Norfolkia Fowler, 1953

Norfolkia Fowler, 1953: 262. Type species: *Norfolkia lairdi* Fowler, 1953 (= *N. squamiceps* (McCulloch et Waite, 1916)).

Diagnosis. A tripterygiid fish genus with a scaled occiput and pectoral fin base (often also scales on cheeks and operculum), a discontinuous lateral line

consisting of an upper, pored series separated by three rows from a lower series of incised scales. First dorsal fin with 4 spines. Anal fin with 2 spines.

Species belonging to *Norfolkia*

Tripterygion brachylepis Schultz, 1960: see below.

Tripterygion clarkei Morton, 1888.

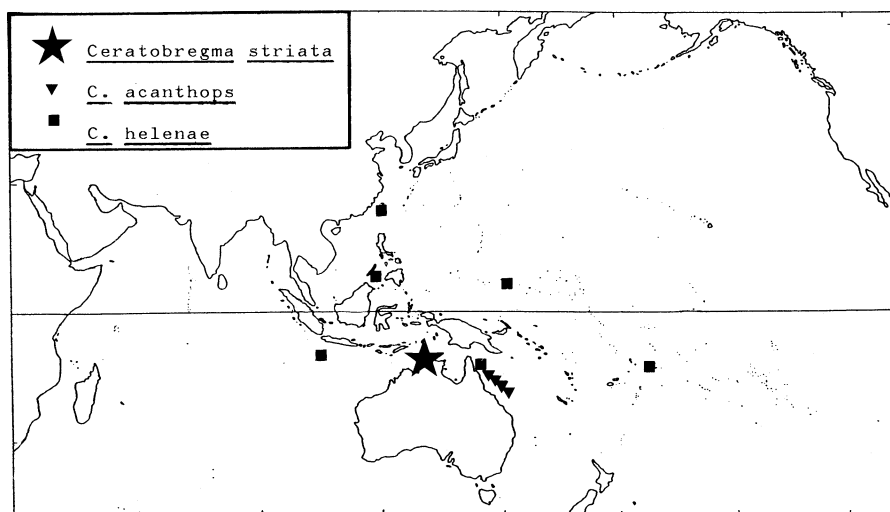
Gillias squamiceps McCulloch et Waite, 1916: 449, pl. 49, fig. 1 (Lord Howe Island; Norfolk Island) (= *Norfolkia lairdi* Fowler, 1953).

Tripterygion striaticeps Ramsay et Ogilby, 1888.

Norfolkia thomasi Whitley, 1964 b: 192 (Heron Island).

Table 1. Proportions of the holotype of *Ceratobregma striata* sp. nov. (expressed as thousands of SL). SL of the holotype 29.5 mm.

Predorsal (1) length	213
Predorsal (2) length	283
Predorsal (3) length	699
Preanal fin length	418
Prepectoral fin length	270
Prepelvic fin length	198
Head length	270
Body depth	189
Body width	156
Eye diameter	90
Preorbital length	68
Bony interorbital	27
Caudal peduncle length	124
Caudal peduncle depth	76
Upper jaw length	108
1st D_1 spine length	143
2nd D_1 spine length	118
3rd D_1 spine length	86
1st D_2 spine length	127
5th D_2 spine length	139
Last D_2 spine length	36
1st D_3 ray length	162
5th D_3 ray length	110
Last D_3 ray length	49
2nd A spine length	73
5th A ray length	95
21th A ray length	97
Last A ray length	68
Pectoral fin length	325
1st pelvic ray length	166
2nd pelvic ray length	237
Caudal fin length	187
D_1 base length	72
D_2 base length	378
D_3 base length	145
A base length	449

Fig. 2. Geographical distribution of *Ceratobregma*.

Norfolkia brachylepis (Schultz, 1960) n. comb.
(Fig. 3)

Tripterygion brachylepis Schultz, 1960: 291, fig. 113 (Bikini Atoll).

Norfolkia springeri Clark, 1980: 95, fig. 9 (Gulf of Elat, Red Sea); Dor, 1984: 234 (Ras el Burqa; Ras Muhammad, Red Sea); Holleman, 1986: 758, fig. 236.9 (Natal, South

Africa; Sri Lanka; Taiwan; Philippines; southern Japan).

Material. NTM S10809–018, 2 males, 29.3–30.2 mm SL, NW tip of Rosemary Island, Dampier Archipelago, Western Australia, 2–4 m depth, rocks, sand, sargassum and thick algae; H. Larson; 25 Apr. 1983.

Description. D_1 IV; D_2 XIV; D_3 viii, 1–ix, 1; A II, xvii, 1–II, xviii, 1 (total 20–21); P_1 ii–iii, 6–7, vii (total 8–9 + 7 = 15–16); P_2 I, 2; C (iv–v), ii, 8–9, ii, (iii–iv). Lateral line scales 16 + 19–21. Total lateral

Table 2. Comparison of *Ceratobregma striata* sp. nov. and *C. acanthops* (proportions expressed as thousands of SL).

	<i>C. striata</i>	<i>C. acanthops</i>
Sides of head behind eye	with scales	scaleless
Lateral line scales	14 + 21	16–18 + 21
Preorbital spines	4	3
5th D_2 spine length	110	201
1st D_1 spine	as long as 2nd D_1 spine	only half as long as 2nd D_1 spine
pectoral fin length	325	380
Pectoral fin	reaching to below 14 th spine of D_2 (not to D_3)	reaching to below 1st spine of D_3
Caudal fin length	187	230
Pectoral fin base	naked	scaled
Color pattern D_1	with 3 broad dark stripes	spotted with gray
Color pattern D_2	with 8 basal black blotches; dusky; distally with a black margin	spotted with gray
Color pattern D_3	with 3 basal dark bands	colorless
Color pattern A	last rays distally blackish	colorless
Color pattern body	upper sides with 14 vertical dark brown streaks (2 unpaired and 6 pairs); lower sides with 8 pairs of dark brown spots	plain grayish brown

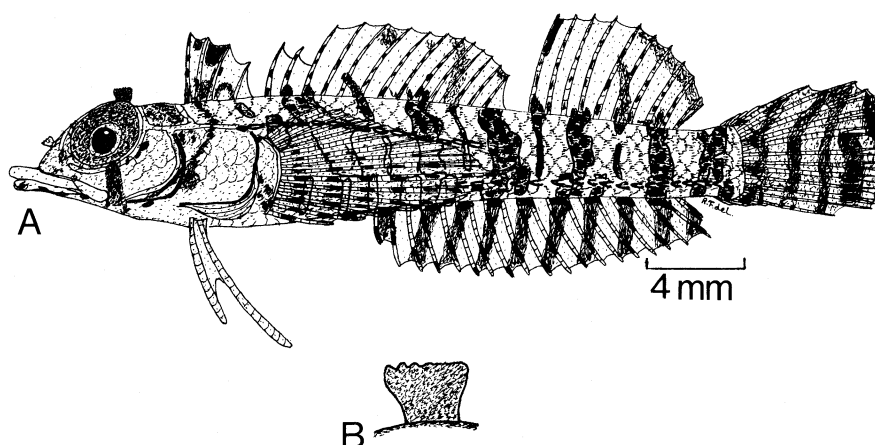


Fig. 3. *Norfolkia brachylepis* (Schultz, 1960), NTM S10809-018, specimen 2, 29.3 mm SL, Dampier Archipelago, Western Australia. A, lateral view; B, left orbital tentacle.

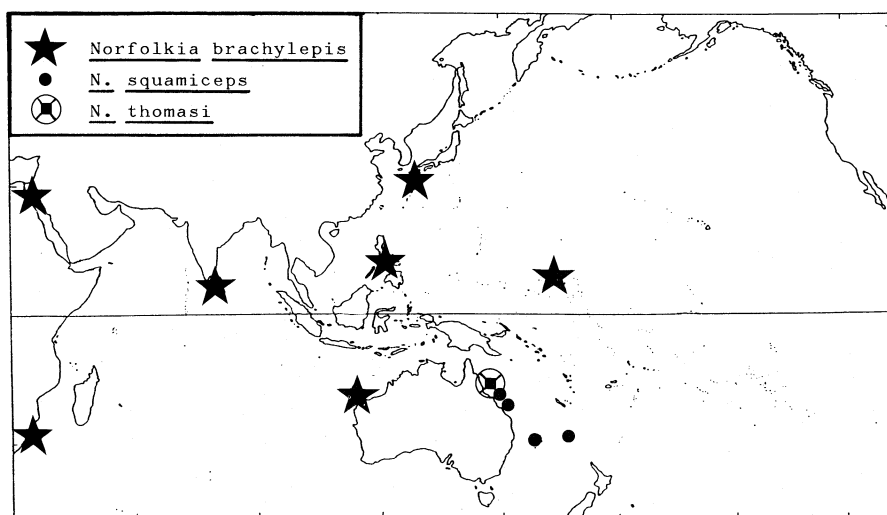


Fig. 4. Geographical distribution of *Norfolkia brachylepis*, *N. squamiceps* and *N. thomasi*.

scale series 34-35. Transverse scale rows 10-11. Proportions see Table 3 (expressed as thousands of SL).

Body elongate and laterally compressed. Head 3.2 in snout. Snout angle 65° . Preorbital length 4.2-5.1 in head. Eye 2.9-3.1 in head. Bony interorbital 12-12.4 in head. Interorbital with a few serrae. Nostril with a broad flapped tentacle with a fringed dorsal margin. Anterior margin of orbit smooth. Eye dorsally with a broad flapped tentacle having a fringed dorsal margin (Fig. 3 B). Upper jaw length (maxillary+premaxillary) 2.2-2.3 in head. Lateral line running from interorbital to preorbital region

and along the sides of the head, with a suborbital and a preoperculo-mandibular branch. The lines of the opposite sides are interconnected by a very slightly curved (nearly I-shaped) branch across the occiput. Lateral line consisting of 16 pored scales (4th scale row from above) in the anterior series, ending below last D_2 spine, discontinuous, continuing three scale rows lower with 19-21 posteriorly incised scales (7th scale row from above). The two lateral line series overlap over 2.5 vertical scale rows. Occiput, cheeks, operculum, pectoral fin base and belly covered with scales. Body with ctenoid scales. Caudal peduncle length 9.1-9.5 in SL. Caudal peduncle depth 11.5-

Table 3. Proportions of the northwestern Australian specimens of *Norfolkia brachylepis* (expressed as thousands of SL).

	Specimen 1, male, 30.2 mm SL	Specimen 2, male, 29.3 mm SL
Predorsal (1) length	218	227
Predorsal (2) length	334	338
Predorsal (3) length	706	700
Preanal fin length	476	481
Prepectoral fin length	331	339
Prepelvic fin length	218	229
Head length	310	308
Body depth	173	181
Body width	193	197
Eye diameter	101	106
Preorbital length	73	61
Bony interorbital	25	26
Caudal peduncle length	106	110
Caudal peduncle depth	82	87
Upper jaw length	139	139
1st D ₁ spine length	108	98
2nd D ₁ spine length	98	90
3rd D ₁ spine length	76	86
4th D ₁ spine length	47	60
1st D ₂ spine length	83	73
5th D ₂ spine length	134	121
Last D ₂ spine length	47	67
1st D ₃ ray length	141	145
5th D ₃ ray length	145	149
Last D ₃ ray length	78	58
1st A spine length	45	48
5th A ray length	132	99
Last A ray length	74	46
Pectoral fin length	328	328
1st pelvic ray length	145	157
2nd pelvic ray length	216	220
Caudal fin length	219	198
D ₁ base length	106	94
D ₂ base length	356	367
D ₃ base length	202	213
A base length	450	438

12.4 in SL.

First to third spines of first dorsal fin longer than first and second spines of second dorsal fin. Predorsal (1) length 4.4–4.6 in SL. First and second spines of second dorsal fin short, subequal in length, shorter than 3rd spine. Predorsal (2) length 2.9–3.0 in SL. Predorsal (3) length 1.4–1.5 in SL. Anal fin beginning below 7th spine of second dorsal fin. Preanal fin length 2.0–2.1 in SL. Pectoral fin length 3.05 in SL. Pectoral fin reaching back to 10th anal fin ray. Pelvic fin reaches back to anus. Caudal fin distally mostly straight.

Color in alcohol: Yellowish; suborbital region with a vertical brown streak. Operculum with an oblique dark brown line basally. Sides of head and pectoral fin base with a few dark brown spots. Eye dark gray. Orbital tentacle dusky. Dentary with 4 dark spots. Sides of body with 6 small and 6 broad irregular, vertical dark brown streaks (total 12). First dorsal fin with a black, distal blotch on second membrane and irregular brown spots and lines. Second and third dorsal fins with dark, basal spots and brown streaks posteriorly and distally. Anal fin with 10 transverse, dark brown streaks, each originating from dark, basal blotch. Caudal fin with irregular dark brown streaks. Lower half of pectoral fin with 7 vertical streaks consisting of dark brown spots. Pelvic fin colorless.

Distribution. *Norfolkia brachylepis* is widespread in the Indo-West Pacific, from the Red Sea and South Africa to Japan, the Marshall Islands and northwestern Australia (Fig. 4). In NW Australia, it was collected in shallow water of 2–4 m depth.

Relationships. *Norfolkia brachylepis* is compared with allied species in Table 4. The distribution areas of three species of *Norfolkia* are compared in Fig. 4.

Discussion. During a revision of the *Norfolkia brachylepis* complex, I found that the above material

Table 4. Characters distinguishing species of *Norfolkia*. The characters different from those of *Norfolkia brachylepis* are underlined.

	<i>N. brachylepis</i>	<i>N. squamiceps</i>	<i>N. thomasi</i>	<i>N. sp.</i> (Whitley, 1964a)
D ₂	XIII–XIV	XV	XIV–XV	XIV
A	II, xvii–xviii, 1 (tot. 20–21)	II, <u>xix–xx, 1</u> (tot. 22–23)	II, <u>xviii–xix, 1</u> (tot. 21–22)	II, xvii, 1 (tot. 20)
Llat	16–17+19–24	<u>21–24+16–18</u>	<u>13+21–22</u>	<u>20+13</u>
Total lateral scales	34–35	<u>34–36</u>	<u>31–32</u>	<u>30</u>
Anal fin color pattern	9–10 transverse dark bands	<u>11 basal dark spots; centrally dusky; distal half whitish</u>	<u>“as in <i>N. squamiceps</i>” (?)</u> (Whitley, 1964b)	<u>uniform blackish centrally, white basally and distally</u>

from Australia agreed in all respects with comparative material of *Norfolkia springeri* Clark, 1980 from the Red Sea (USNM 205793, holotype, 36.8 mm SL; USNM 205794, 2 paratypes, 26 and 39 mm SL; USNM 205795, 1 paratype, 26 mm SL; HUJF 5355, 2 paratypes, 36–37 mm SL) and of *Norfolkia brachylepis* (USNM 142253, holotype, 25.5 mm SL). The two specimens from NW Australia show that both *N. springeri* and *N. brachylepis* are within the same range of characters. The two species *Norfolkia springeri* and *N. brachylepis* are therefore synonymized in the present paper, with *N. brachylepis* as the valid name of the species.

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オーストラリア北部から採集されたヘビギンボ科の1新種 *Ceratobregma striata* と西オーストラリアからの *Norfolkia brachylepis* の初記録

Ronald Fricke

ヘビギンボ科の新種 *Ceratobregma striata* は以下の形質によって特徴づけられる。すなわち第2背鰭に17棘をもち、第3背鰭に8軟条、臀鰭に20軟条(棘と軟条の合計は22)あり、側線鱗数の総計が35–37枚であること、頭部側面の眼の後方と頬の鱗に小棘を有し、体側背方に14本の暗色黄帯をもち、第2背鰭基部に8個の黒色斑を有する。*Ceratobregma* 属の種の検索表を示した。また、西オーストラリアから初記録の *Norfolkia brachylepis* を記載した。*N. springeri* は *N. brachylepis* のシノニムである。